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EXAMINER	
MONIKANG, GEORGE C	

ART UNIT	PAPER NUMBER
2615	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/595,403	DERUGINSKY ET AL.	
	Examiner	Art Unit	
	George C. Monikang	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8-10,13-15,17-22,24,25 and 28-32* is/are rejected.

7)☒ Claim(s) *6,7,11,12,16,23,26 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/14/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 32 is objected to because of the following informalities: The claim states "the MEMS microphone member" of claim 29 but claim 29 does not disclose a MEMS microphone member. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 8-10, 13-15, 17-18, 20-22, 25, 28-29, 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eschauzier et al, US Patent 6,160,450, in view of Eschauzier et al admitted prior art (*hereinafter referred to as AAPA; figs. 2 & 3; col. 2, lines 1-29*). (The Eschauzier et al reference is cited in IDS filed 4/14/2006)

Re Claim 1, Eschauzier et al discloses a microphone preamplifier, comprising a differential input stage with a first and a second input terminal and output stage with an output terminal (*fig. 4; col. 3, line 66 through col. 4, line 32*); where the microphone preamplifier is integrated on a semiconductor substrate (*fig. 4; col. 3, line 66 through col. 4, line 32*); and a feedback circuit (*fig. 4; col. 3, line 66 through col. 4, line 32*), where the second input terminal provides an input for a microphone signal (*fig. 4: in m; col. 4, lines 11-24*); but fails to disclose a low-pass frequency transfer function, coupled between the output terminal and the first input terminal and integrated on the semiconductor substrate; where the second input terminal provides an input for a microphone signal. However, AAPA does (*figs. 2 & 3; col. 2, lines 1-29*).

Taking the combined teachings of Eschauzier et al and AAPA as a whole, one skilled in the art would have found it obvious to modify the microphone preamplifier, comprising a differential input stage with a first and a second input terminal and output stage with an output terminal (*fig. 4; col. 3, line 66 through col. 4, line 32*); where the microphone preamplifier is integrated on a semiconductor substrate (*fig. 4; col. 3, line 66 through col. 4, line 32*); and a feedback circuit (*fig. 4; col. 3, line 66 through col. 4, line 32*), where the second input terminal provides an input for a microphone signal (*fig. 4: in m; col. 4, lines 11-24*) of Eschauzier et al with a low-pass frequency transfer function, coupled between the output terminal and the first input terminal and integrated on the semiconductor substrate; where the second input terminal provides an input for a microphone signal as taught in AAPA (*figs. 2 & 3; col. 2, lines 1-29*) so the amplifier can be properly biased.

Re Claim 2, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the differential input, stage comprises an inverting input and a non-inverting input wherein the non-inverting input is arranged to receive the microphone signal (*Eschauzier et al, col. 4, line 16-21; AAPA, fig. 3: in p*), and the inverting input is arranged to receive a feedback signal provided by the feed-back circuit (*Eschauzier et al, col. 4, line 16-21; AAPA, fig. 3: in m*).

Re Claim 8, which further recites, "Wherein the feedback circuit is an active filter." Eschauzier et al and AAPA do not explicitly disclose an active filter as claimed. Official notice is taken that both the concepts and advantages of providing an active filter are well known in the art. It would have been obvious to use an active filter since it is commonly used to shape the filter's response and buffer the filter from the electronic components it drives.

Re Claim 9, which further recites, "Wherein the feedback circuit is a passive filter." Eschauzier et al and AAPA do not explicitly disclose a passive filter as claimed. Official notice is taken that both the concepts and advantages of providing a passive filter are well known in the art. It would have been obvious to use a passive filter since it is commonly used to block low frequency signals and cause them to go through the load.

Re Claim 10, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the feedback circuit is configured with an active device which provides an ohmic impedance across a two-port circuit (*Eschauzier et al, fig. 4: M1, M2 & Itail*).

Re Claim 13, the combined teachings od Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the feedback circuit comprises a source providing a DC offset (*Eschauzier et al, fig. 4: Voffset; col. 4, lines 33-45*).

Re Claim 14, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the feedback circuit comprises a filter (*AAPA, fig. 3: LPF*) with a source that provides a DC offset (*Eschauzier et al, fig. 4: Voffset; col. 4, lines 33-45*).

Re Claim 15, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein a DC offset is provided at the first input of the preamplifier by a circuit configuration comprising a current source coupled, at the circuit node of the first input of the preamplifier (*Eschauzier et al, fig. 4: Voffset; col. 4, lines 33-45*), to an active device which provides an ohmic impedance across a two-port circuit (*Eschauzier et al, fig. 4: M1, M2 & Itail*).

Re Claim 17, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the differential input stage comprises a first and second current path for the respective differential inputs (*Eschauzier et al, fig. 4: in p & in m*), and wherein a DC offset is provided by establishing different DC currents through the first and second current path of the differential input stage (*Eschauzier et al, fig. 4:Voffset, M1 & M2*).

Re Claim 18, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the preamplifier is configured to receive the microphone signal via an input bias element which has relatively high ohmic

impedance when the microphone signal is relatively small in magnitude and relatively low ohmic impedance when the microphone signal is relatively high in magnitude (*Eschauzier et al, fig. 4; col. 4, lines 11-32*).

Re Claim 20, which further recites, "Wherein the bias element is configured by two cross-coupled bipolar transistors." Eschauzier et al and AAPA do not explicitly disclose Bipolar transistors as claimed. Official notice is taken that both the concepts and advantages of providing bipolar transistors are well known in the art. It would have been obvious to use bipolar transistors since it is commonly used in amplifying and switching applications.

Re Claim 21, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 18, wherein the bias element is configured by two cross-coupled Metal Oxide Semiconductor, MOS, devices (*Eschauzier et al, fig. 4: M1 & M2*).

Re Claim 22, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the preamplifier is a differential amplifier which is configured to convert an input signal into a common mode signal for low frequencies and into a differential for audio frequencies (*Eschauzier et al, fig. 4; col. 4, lines 11-15*).

Re Claim 25, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein a phase shifter is coupled between inputs of the differential amplifier (*Eschauzier et al, fig. 4: Celectret*).

Re Claim 28, which further recites, "Comprising a voltage pump integrated on the semiconductor substrate." Eschauzier et al and AAPA do not explicitly disclose a voltage pump as claimed. Official notice is taken that both the concepts and advantages of providing a voltage pump are well known in the art. It would have been obvious to use a voltage pump since they are commonly used to increase the reference voltage to a bias voltage.

Re Claim 29, the combined teachings of Eschauzier et al and AAPA disclose a microphone according to claim 1, comprising an electret microphone configured to provide a microphone signal, responsive to a sound pressure on the electret microphone, to the microphone preamplifier (*Eschauzier et al, fig. 4; abstract*).

Re Claim 31, which further recites, "Comprising a MEMS microphone member to provide a microphone signal, responsive to a sound pressure on the MEMS microphone, to the microphone preamplifier." Official notice is taken that both the concepts and advantages of providing a MEMS microphone is well known in the art. It would have been obvious to use a MEMS microphone since they are small in size and can withstand mechanical shocks.

Re Claim 32, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 29, wherein the MEMS microphone member and the microphone preamplifier are integrated on a semiconductor substrate (*Eschauzier et al, fig. 4*).

Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eschauzier et al, US Patent 6,160,450, and Eschauzier et al admitted prior art (*hereinafter referred to as AAPA; figs. 2 & 3; col. 2, lines 1-29*), and further in view of Tsinker, US Patent 6,150,875.

Re Claim 3, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the feedback circuit is a filter with a transfer function (*AAPA, col. 2, lines 1-6*), in the frequency domain (*AAPA, col. 2, lines 1-6*), but fails to disclose a zero and a pole; wherein the zero is located at a higher frequency than the pole. However, Tsinker does (*col. 6, lines 31-42*).

Taking the combined teachings of Eschauzier et al, AAPA and Tsinker as a whole, one skilled in the art would have found it obvious to modify the microphone preamplifier according to claim 1, wherein the feedback circuit is a filter with a transfer function (*AAPA, col. 2, lines 1-6*), in the frequency domain (*AAPA, col. 2, lines 1-6*) of Eschauzier et al and AAPA with a zero and a pole; wherein the zero is located at a higher frequency than the pole as taught in Tsinker (*col. 6, lines 31-42*) so that circuit could be more effective.

Re Claim 4, which further recites A microphone preamplifier according to claim 1, wherein the preamplifier has a transfer function, in the frequency domain, with a zero and a pole; wherein the pole is located in the range 0.1 Hz to 50 Hz or 0.1 Hz to 100 Hz or 0.1 to 200 Hz.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eschauzier et al, US Patent 6,160,450, and Eschauzier et al admitted prior art (*hereinafter referred to as AAPA; figs. 2 & 3; col. 2, lines 1-29*), and further in view of Bhandari et al, US Patent 6,424,480 B1.

Re Claim 5, Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, wherein the feedback circuit is a filter which (*AAPA, col. 2, lines 1-6*), in the frequency domain (*AAPA, col. 2, lines 1-6*), but fails to disclose a relatively high gain level below a transition frequency range and a relatively low gain level above the transition frequency range. However, Bhandari et al does (*col. 4, lines 8-15*).

Taking the combined teachings of Eschauzier et al, AAPA and Bhandari et al as a whole, one skilled in the art would have found it obvious to modify the microphone preamplifier according to claim 1, wherein the feedback circuit is a filter which (*AAPA, col. 2, lines 1-6*), in the frequency domain (*AAPA, col. 2, lines 1-6*) of Eschauzier et al and AAPA with a relatively high gain level below a transition frequency range and a relatively low gain level above the transition frequency range as taught in Bhandari et al (*col. 4, lines 8-15*) to control the gain and feedback of the amplifier.

Re Claim 6, the combined teachings of Eschauzier et al, AAPA and Bhandari et al disclose a microphone preamplifier according to claim 5, but fails to disclose wherein the transition frequency range is located below a frequency of about 100 Hz.

However, establishing a transition frequency range below 100 Hz is the inventor's preference thus it would have been obvious for Eschauzier et al, AAPA and

Bhandari to modify the transition frequency range below 100 Hz for the motivation of amplifying a low level signal with high frequency and low distortion.

Claim 7 has been analyzed and rejected according to claim 6.

Claims 19 & 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eschauzier et al, US Patent 6,160,450, and Eschauzier et al admitted prior art (*hereinafter referred to as AAPA; figs. 2 & 3; col. 2, lines 1-29*), and further in view of French et al, US Patent 5,337,011.

Re Claim 19, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 18, but fail to disclose wherein the bias element is configured by two cross-coupled diodes. However, French et al does (*fig. 2: 36; col. 1, line 61 through col. 2, line 18*).

Taking the combined teachings of Eschauzier et al, AAPA and French et al as a whole, one skilled in the art would have found it obvious to modify the microphone preamplifier according to Eschauzier et al and AAPA with wherein the bias element is configured by two cross-coupled diodes as taught in French et al (*fig. 2: 36; col. 1, line 61 through col. 2, line 18*) to reduce noise content.

Re Claim 30, the combined teachings of Eschauzier et al and AAPA disclose a microphone module according to claim 1, but fail to disclose wherein the electret microphone is mounted inside a space formed by a cartridge, and wherein the microphone preamplifier is integrated within the microphone module. However, French et al does (*abstract*).

Taking the combined teachings of Eschauzier et al, AAPA and French et al as a whole, one skilled in the art would have found it obvious to modify the microphone module according to Eschauzier et al and AAPA with wherein the electret microphone is mounted inside a space formed by a cartridge, and wherein the microphone preamplifier is integrated within the microphone module as taught in French et al (*abstract*) to reduce noise content.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eschauzier et al, US Patent 6,160,450, and Eschauzier et al admitted prior art (*hereinafter referred to as AAPA; figs. 2 & 3; col. 2, lines 1-29*), and further in view of Huckins et al, US Patent 6,731,163 B2.

Re Claim 24, the combined teachings of Eschauzier et al and AAPA disclose a microphone preamplifier according to claim 1, but fails to disclose wherein a differential amplifier is configured to provide frequencies below an audio band as common mode signals and audio band signals as differential mode signals. However, Huckins et al does (*abstract: able to provide common mode and differential signals*).

Taking the combined teachings of Eschauzier et al, AAPA and Huckins et al as a whole, one skilled in the art would have found have found it obvious to modify the microphone preamplifier according to Eschauzier et al and AAPA with wherein a differential amplifier is configured to provide frequencies below an audio band as common mode signals and audio band signals as differential mode signals as taught in

Huckins et al (*abstract: able to provide common mode and differential signals*) to reduce the effect of compensation capacitance during differential mode operation.

Allowable Subject Matter

Claims 11-12, 16, 23 & 26-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter for claim 11: The prior art does not teach or moderately suggest the following limitations:

The feedback circuit comprising a configuration with a first and a second active device and a current source, where the devices comprise a respective gate terminal, a source terminal and a drain terminal, and where the gate terminals are interconnected at a node connected to the current source and the drain terminal of the first device, and where the source terminals are interconnected, to provide the second device in a state where an ohmic resistance is provided between its drain and source terminal.

Limitations such as these may be useful in combination with other limitations of claim 1.

The following is a statement of reasons for the indication of allowable subject matter for claim 12: The prior art does not teach or moderately suggest the following limitations:

The feedback circuit comprising a filter with an input port connected to a series connection of a first and second resistor which forms a resistor node at their interconnection, and connected to a series connection of a first and second capacitor which forms a capacitor node at their interconnection; and an output port at the capacitor node; wherein the resistor node and capacitor node are interconnected by an active device which provides an ohmic impedance across a two-port circuit.

Limitations such as these may be useful in combination with other limitations of claim 1.

The following is a statement of reasons for the indication of allowable subject matter for claim 23: The prior art does not teach or moderately suggest the following limitations:

A differential amplifier is configured as an instrumentation type amplifier with two inputs and a first and a second output, where the first and second input are arranged to receive a microphone signal, and the inputs are coupled to receive the microphone signals substantially in phase at relatively low frequencies and substantially out of phase at relatively high frequencies.

Limitations such as these may be useful in combination with other limitations of claim 1.

The following is a statement of reasons for the indication of allowable subject matter for claim 26: The prior art does not teach or moderately suggest the following limitations:

A phase shifter cross coupled between an output of one side of the differential amplifier and an input of the opposite side of the differential amplifier.

The following is a statement of reasons for the indication of allowable subject matter for claim 27: The prior art does not teach or moderately suggest the following limitations:

A phase shifter coupled between a signal node, in phase with an input signal to the amplifier, and an input terminal of an opposite side of the differential amplifier.

Claim 16 has been analyzed and treated according to claim 11.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George C. Monikang whose telephone number is 571-270-1190. The examiner can normally be reached on M-F. alt Fri. Off 7:30am-5:00pm (est).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

George Monikang 8/18/2007

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